



Natural and Enhanced Attenuation for Chlorinated Solvents: New Developments and Tools



The Department of Energy's Office of Environmental Management's Office of Groundwater and Soil Remediation and the Savannah River National Laboratory invite you to attend a seminar that introduces the processes and tools developed by a national team of scientists challenged to identify and then develop the "next generation" tools to support the implementation of attenuation based remedies at chlorinated solvent contaminated sites. Attendees will be introduced to the latest information related to attenuation based remedies for sites contaminated with chlorinated solvents. By attending this meeting you will get ahead of the curve on topics being incorporated into upcoming technical regulatory guidance by the Interstate Technology Regulatory Council. Though many of the new tools are specific for chlorinated solvents, the three main technical concepts that were the basis for selecting the research studies are transferable to metals and radionuclides.

Locations and Dates

Oak Ridge, TN - March 13, 2007
Tennessee Department of
Environment and
Conservation—DOE Oversight
Offices
761 Emory Valley Road
Oak Ridge, TN 37830

Richland, WA—April 18, 2007
WSU Tri-Cities
Consolidated Information
Center
2770 University Dr.
Richland, WA 99352

Aiken, SC—April 26, 2007

Morning Session (8:30 am—11 am)

The morning session is intended for those attendees who want an overview of the project.

Topics to be presented are:

- Review of Project Objectives, Goals, History, Structure
- Summary of Collaborative Work with ITRC and ITRC Products
- Overview of New Processes, Tools, and Products
- Present Examples and Case Studies that put emphasis on relevance to waste unit characterization and remediation actions and decisions (How the new processes, tools, and products can be integrated into a site's remediation process.).
- Future Needs

Afternoon (12:30 pm— 4 pm)

The afternoon session is intended for those attendees who want details on selected technical developments of the research studies. The product introductions in this session are designed to be interactive. The emphasis will be on the practical application of the tools.

There will be 2 concurrent sessions with 3 topics each. One (1) hour has been provided for each production introduction with a 15 minute break between.

See Page 2 for Session Outlines and Product Introduction Descriptions

**For information and to sign up,
contact:**

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Who Should Attend

Environmental technical professionals, regulators, managers responsible for site remediation efforts, and parties interested in the use of attenuation based remedies.

Product Introduction Outline and Descriptions

Session 1

1-1. BIOBALANCE – A model based on the BIOCHLOR model. This model provides users a tool that calculates plume growth over time, providing an estimate of when a plume will reach its greatest length. For reductive degradation, this model also evaluates how much electron donor is needed to overcome competing electron acceptors in the system to sustainably degrade the contaminant of interest. BIOBALANCE supports early choices of potentially viable MNA and biostimulation options.

1-2. Numerical Modeling and Flux Calculation for MNA and Enhanced Attenuation - A reactive transport model applied as a tool for evaluation and implementation of MNA and Enhanced Attenuation. The materials developed include reaction modules for complex chlorinated solvent reactions and a software utility designed to provide modeling results in terms of mass flux to support mass balance evaluations. Documentation provides guidance and information for using numerical models for MNA and Enhanced Attenuation. The workshop will include applying the tools to a case study. The specific tools are for the MODFLOW-based RT3D reactive transport code, but much of the numerical modeling information could also be applied on other modeling platforms.

cVOC Decision Analysis Tool – A tool based on a structured analytic approach for comparing alternative remedial approaches at sites containing groundwater contaminated with cVOCs. The analytic approach is based on multiple-attribute utility analysis, which balances competing objectives through application of value judgments reflecting tradeoffs the decision-maker is willing to make between those objectives. The tool was designed as a user-friendly spreadsheet that will be useful at sites with any type of ongoing treatment and will give fair consideration to Enhanced Attenuation and MNA alternatives. Some inputs to this tool will be the outputs from analytical (e.g., BIOBALANCE) or numerical (e.g., RT3D) models.

Session 2

2-1. Field Tools – This product introduction will present several of field tools for measuring key parameters used in selecting and evaluating Monitored Natural Attenuation and Enhanced Attenuation. Included will be push-pull aquifer tests used for estimating attenuation rates, an oxygen sensor that was developed for oceanographic purposes and is an improvement over the current methods for long-term measuring of dissolved oxygen, and a method to measure contaminant flux in a groundwater monitoring well called the “passive flux meter”.

2-2. Scenarios – A guide to provide practitioners with an appropriate level of site specificity to assist in planning/supporting characterization, modeling, and implementation of MNA and Enhanced Attenuation. The tool consists of a user's guide and 13 scenarios built around site geochemical and hydrogeologic conditions. The Scenarios package contains a significant amount of up-to-date information to support evaluation and implementation of MNA and Enhanced Attenuation.

2-3. Molecular Biological Tools (MBTs) – This product introduction will present a summary of the developments associated with MBTs, both in this project and by other programs. There will be discussions occurring around MBTs that provide information on *Dehalococcoides* species associated with the reductive dechlorination of tetrachloroethene and trichloroethene. In addition, progress being made by researchers on developing MBTs and associated probes for other biological mechanisms, such as aerobic and cometabolic processes will be reported. Participants will engage in several scenario-based exercises designed to illustrate the advantages and limitations of MBT data. How information gained from MBT analyses can be integrated into the overall MNA/EA decision making/implementation process will be emphasized.